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PAGE 32, TABLE 4
UNIVERSITY CONTINUING EDUCATION
NON-CREDIT COURSE REGISTRATIONS
1981-82

TOTAL SHOULD READ: 113 988

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Annual Report
1982-83

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December 5, 1983

The Honourable Robert G. Rogers
Lieutenant-Governor of British Columbia

MAY IT PLEASE YOUR HONOUR:

Herewith, I respectfully submit the Annual Report of the Ministry of Universities, Science and Communications for the year ended March 31, 1983.

Yours truly

Patrick L. McGeer
MINISTER

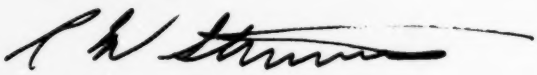
December 5, 1983

The Honourable Patrick L. McGeer
Minister of Universities, Science and Communications
Parliament Buildings
Victoria, B.C.

Sir:

I have the honour to submit the Annual Report of the Ministry of Universities, Science and Communications for the year ended March 31, 1983.

Yours truly



Robert W. Stewart
DEPUTY MINISTER

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MINISTER'S MESSAGE

1982/83 was a year when the provincial government -- including our own Ministry of Universities, Science and Communications -- grappled with the difficult economic times encountered by our whole society. However, despite the severity of the recession, we were able to maintain our previous level of support for all our major programs.

In last year's annual report I wrote of "the commitment of the government to our most valuable asset -- our coming generation of social, professional and industrial leaders." I am proud to say that commitment has not been dimmed by recession. Despite the tough economic times we realize just how essential it is to build for the future.

With the need to broaden our economic base so increasingly evident, the actions in our ministry have contined to be directed towards promoting British Columbia's high technology future. These include: a new engineering school at the University of Victoria; a vibrant engineering science program at Simon Fraser University; special funds for strengthening the established applied science program at UBC; research parks administered by Discovery Parks Incorporated (now operating at all three of our universities and the British Columbia Institute of Technology); and programs of industrial and university research support funded by our ministry.

In Japan...in the Silicon Valley in California...in the Research Triangle of South Carolina...in the high technology centre of Boston, Massachusetts...and even in our own far-away federal capital of Ottawa...the decision-makers in high tech business are looking towards British Columbia as a site for future development.

This annual report tells only part of the story of our ministry. Our Deputy Minister's message, on the following page, describes our activities. Please read it with interest, but keep in mind that the real action -- the action for the future -- takes place behind the formal organization chart. The imagination and energy of all the people in our ministry who dedicate themselves to building a better future simply cannot be described in words.

DEPUTY MINISTER'S MESSAGE

The principal tone of 1982/83 was one of restraint and consolidation. Few new initiatives were undertaken. However there were many satisfying developments as previous initiatives of the ministry and its predecessors bore fruit.

The Methane Energy Development Program advanced to the point that over 500 fleet vehicles were converted to the use of natural gas as a vehicle fuel, and private natural gas fuelling station outlets were established.

Several projects supported by Science Council grants have led to products, or improvements in products, moving into the world market.

Several holders of Industrial Post-doctoral Fellowships have made major career progress and at least one has established his own company.

Students are now graduating from our universities with high degrees obtained while supported by Graduate Research, Engineering and Technology (GREAT) Awards.

The Discovery Parks system began to work. Microtel Pacific Research opened its research facility at the Simon Fraser park and vigorous interaction was established between officers at that facility and faculty at the University. The multi-tenant facility at the BCIT site was opened and began to be occupied by a variety of private sector firms.

A team at BC Research was awarded the Science Council Gold Medal for Industrial Innovation.

An engineering program at UVic and an engineering science program at SFU were put in train.

Holders of Athletic Scholarships at British Columbia universities have been making their mark in both professional and amateur teams both on a national and international level. An outstanding example was Canada's Gold Medal winning basketball team at the World Student Games which had no fewer than four Athletic Scholarship holders.

There was increased utilization of the Open Learning Institute. The Knowledge Network became firmly established among the institutions of the province, substantially aided by the installation of a number of satellite receiving stations in small localities of the province aided by Program for Educational and Entertainment Television Services Grants.

Cabinet agreed on the planning and installation of a new network -- PROVNET -- for communications within the provincial government service.

In cooperation with the Electronic Manufacturers' Association of British Columbia, the Communications Division created an Awards of Excellence Program for significant research into electronic products and service in British Columbia. There proved to be ample competition to justify three awards and an honourable mention.

TVRO (satellite dishes) business has mushroomed in British Columbia, including export business, partly in response to ministry communications policy.

The retail food conversion program of the Metric Division moved forward with much less difficulty than anticipated.

These developments are cause for satisfaction, but not complacency. Much more remains to be done, and it will have to be done with fewer resources.

MINISTRY ADMINISTRATION DIVISION

Ministry Administration is composed of the Finance and Administration Branch, consisting of the Financial Management Services Section and the Personnel Services Section, the Executive of the Ministry, their secretaries, 16 support staff, and consultants required for special research projects.

EXECUTIVE OF THE MINISTRY

The Executive of the Ministry is responsible for ensuring that the ministry's policies, priorities, and program content, determined by the government, are properly administered. Five senior and middle management staff members report directly to the office of the Deputy Minister.

FINANCE AND ADMINISTRATION BRANCH

ROLE AND FUNCTIONS

The Finance and Administration Branch combines the functions of personnel, systems development, ministry space requirements, financial management and accounting.

Personnel Services Section

Personnel services are provided to each branch of the ministry by the Personnel Manager. The personnel office is responsible for providing technical advice and consultation for recruitment and selection of staff, contract negotiations, and administration, application and maintenance of classification systems, occupational health services, and safety programs. In providing support to the ministry, the personnel office consults with the Public Service Commission, and the Government Employee Relations Bureau.

Financial Management Services Section

Financial Management is responsible for all financial accounting and fiscal controls within the ministry. This responsibility includes providing financial services, coordinating the preparation of the budget, and preparing financial management reports. The section is also responsible for providing office accommodations and coordinating with BC Systems Corporation in supplying the ministry's computer needs.

Accounting responsibilities include preparation of the payroll, processing the ministry's expenditure and revenue, and maintaining and updating the Accounting Policy and Procedures Manual.

THE FUTURE

The 1983-84 objectives of the Finance and Administration Branch are to:

- update and improve the existing accounting Policies and Procedures Manual;
- implement specific financial control policies initiated by the Comptroller-General and Treasury Board.

Gross Expenditures

Comparison of Fiscal Years 1981/82 and 1982/83

Year	Amount
1982/83	$387 594 390
1981/82	356 775 922
1980/81	296 106 151

Summary of Expenditures Related to Estimates

Description of Vote	1982/83 Estimates	1982/83 Actual Expenditure
Minister's Office	$ 165 088	$ 154 223
Ministry Administration and Support	9 224 510	8 735 012
Government Telecommunications	24 352 193	24 096 609
Universities	363 596 359	354 608 546
	$397 338 150	**$387 594 390**

COMMUNICATIONS DIVISION

The Communications Division comprises two principal branches: the Communications Development Branch and the Telecommunications Services Branch.

Generally, the responsibilities of the division are to:

- provide and manage the communications systems required by government ministries and agencies to carry out their assigned responsibilities;
- formulate and implement government policies and regulations which will encourage the orderly development of communications throughout the province;
- support research and development to encourage continuous growth in the telecommunications industry in British Columbia;
- provide grants and consultation services to assist communities to improve their telecommunications services; and
- maintain industry and intergovernmental liaison with respect to provincial and national issues which could jeopardize the realization of maximum benefits from telecommunications for the people of British Columbia.

COMMUNICATIONS DEVELOPMENT BRANCH

The Communications Development Branch consists of the Administration, Policy, Corporate Relations, and Technology Applications sections, and includes engineers, accountants, economists, policy analysts, and research officers.

ROLE AND FUNCTIONS

The role of the Communications Development Branch is to facilitate action by the Government of British Columbia to optimize the social and economic benefits of telecommunications for the people of the province. The branch promotes the orderly development of the telecommunications industry in British Columbia through recommending and implementing policies, supporting research and development, and acting on behalf of the people of British Columbia in regulatory matters. It administers grants to communities to improve their communications systems, and maintains industry and intergovernmental liaison on provincial and national issues. While a functional separation exists between the sections in the branch, there is close cooperation on shared responsibilities.

PROJECTS AND ACHIEVEMENTS

Policy Section

Over the year the activities of the Policy Section centered on efforts to assert provincial jurisdictional authority over pay-TV and the distribution of non-broadcast services by cable companies. This action included a successful commencement of licensing by the British Columbia Utilities Commission (BCUC) and continued efforts directed at a legal challenge to jurisdictional claims of the federal government.

Two Orders-in-Council issued by Cabinet in February 1982 directed BCUC to commence certification of pay-TV operations and cable systems distributing non-broadcast services. The Policy Section provided BCUC with background information and advice as required. BCUC commenced hearings on applications in August 1982 and held subsequent hearings in October, December and February. During the year BCUC issued over 100 certificates for operations. This accomplishment has proceeded despite the difficulty caused by the federal government continuing to exercise its alleged authority in this area, to the point of threatening legal prosecution of some operations not complying with its regulations and directives.

The ministry has endeavoured to maintain an active presence in the field while trying to reduce public confusion created by federal policies concerning pay-TV, cable and TVROs (television receive only satellite dishes).

During the year the federal government indicated that charges would be laid against persons owning or using TVROs to show satellite television without federal approval.

However, after considerable pressure from the provincial government, as well as other interests, the federal policy was modified to permit individuals, bars, nightclubs, and beverage lounges to use TVROs, but not apartments, condominiums, and hotel rooms.

The question of constitutional jurisdiction of federal and provincial governments with respect to pay-TV and non-broadcast television service has been referred to the British Columbia Supreme Court for resolution. Monitoring developments is being carried out by our staff, particularly as they affect British Columbia TVRO owners.

Federal and provincial ministers of communications met in May 1982, in an attempt to harmonize their divergent positions on pay-TV jurisdiction and to consider a report of the federal-provincial Task Force on Joint Regulatory Mechanisms. While they were unable to reach a consensus on pay-TV, they nevertheless directed continued development of the options for joint regulatory mechanisms. Section staff are continuing to participate in that project and a report to the ministers is near completion.

The Policy Section continued to monitor other initiatives of the federal Department of Communications and the Canadian Radio-television and Telecommunications Commission with regard to communications in British Columbia. For example, a submission was made to the CRTC when hearings commenced on the subjects of cable tiering and universal pay-TV.

Other action undertaken during the year included preparing a research paper on Methodologies and Issues in the Pricing of Telecommunications Services, and continuing research and development on options for jurisdictional change by means of constitutional reform.

Objectives

Planned projects for 1983/84 include monitoring federal initiatives with regard to extensions of the Broadcasting Act and Radio Act, preparing responses in order to protect provincial jurisdiction and preparing provincial government testimony and argument for the Supreme Court hearing on pay-TV. The suggested provincial government proposal for communications jurisdiction will be completed, as will the report of the intergovernmental task force on Joint Regulatory Mechanisms. Studies will be conducted on the effects of competition in the delivery of telecommunications services, and on the relationship between costs and prices of telecommunications services, and the impact of probable pricing policies.

Corporate Relations Section

Industry Development

The Corporate Relations Section has a mandate to maintain a close liaison with all sections of the communications research and manufacturing industries operating within the province. The objective is to ensure a strong industry and, where possible, to encourage further participants in these high technology industry sectors.

Corporate Relations Section staff have continued to establish and maintain contacts, through personal visits and telephone contacts. The ministry position has been that it has an interest in the industry, and concern for the problems inherent in the growth of the industry in this province. Industry response has been positive to the government's indicated readiness to listen to their problems and their perception of the industry and its provincial environment.

One of the ministry's objectives in making the industry contacts was to develop and recommend initatives to encourage the expansion of telecommunications research and manufacturing in British Columbia. During the year Corporate Relations became involved in negotiating the disposition of a federal government contract for research on an HF radio data terminal for fish boats, to ensure that provincial companies were aware of the contract. These efforts were successful, and the contract was won by a British Columbian firm.

During the course of discussions with manufacturers it was learned that various provincial companies dealing in many aspects of high technology engineering are too small to individually sponsor a computer assisted design facility for some of their circuit board layouts. Consequently an independent party was asked to do a study, and report to the ministry, on the feasibility of setting up a "job shop" facility. The study had not been completed at fiscal-year end.

Data Base Assembly

The Corporate Relations Section also has the responsibility for assembling and maintaining a comprehensive data base of all participants in the telecommunications industry who have, or may have, an impact on this province, and a comprehensive listing of products now available or being researched in the communications industry.

Consulting Services

The Corporate Relations Section provides an informal consulting service for British Columbia industry, the general public, and government departments, including the federal and other provincial governments.

Requests for information require responses varying from brief verbal answers via telephone, to more complex answers which require considerable research and formal written responses. Many enquiries deal with the growing possibilities to interconnect non-telephone company terminal equipment to the

telephone companies' networks. There have also been some enquiries about the new TAPAC (Terminal Attachment Program Advisory Committee) requirements of the federal government and their impact on small manufacturers in British Columbia.

On occasion the staff are called upon by the British Columbia Utilities Commission for advice on telecommunication topics such as the introduction of cellular mobile radio companies into British Columbia.

There has been a continuing requirement for this ministry to review communications-related applications, made to the federal government under the Foreign Investment Review Act, for their potential impact on this province. The general tenor of the ministry response is to encourage industrial immigration which has the potential to benefit the province.

Research Papers

Despite current staffing restrictions, the Corporate Relations Section expects to produce at least one significant research paper annually. The paper currently under study examines the role of labour in the location of high technology industry, with reference to the labour profile of companies and the training and experience of the participants in the industry.

Symposia, Seminars, and Exhibitions

The section participated in two significant functions this year. The first was the World Communications Year exhibit at the Arts, Science and Technology Centre in Vancouver, which was developed in cooperation with the federal Department of Communications and the telecommunications industry in the province.

The second was a cooperative effort with the executive of the Electronic Manufacturers Association of British Columbia in developing an awards program for significant electronic research performed in British Columbia. Arrangements have been made for three awards to be presented at the EMA's annual general meeting to be held in June, 1983 with this ministry providing the awards. This is seen to be a significant event to highlight the achievements made by the electronics industry in British Columbia.

Regulatory Activities

The Corporate Relations Section is responsible for all telecommunications regulatory activities on behalf of the province. The year 1982/83 saw a number of new rate filings, rate increases, new services offered, complaints investigated, and special regulatory issues with current prominence. Each of these issues can relate to any one of the companies operating in the field of telecommunications in British Columbia.

Although the federal government, through the Canadian Radio-Television and Telecommunications Commission, directly regulates the vast majority of telecommunications operations in British Columbia, it is incumbent on the provincial government to represent both its own interests as a user, and the interests of the people of the province. The 6/5 restraint guidelines from the federal government precluded many potential rate increase applications.

BC Tel filed an interim rate increase application in October which was subsequently rejected by CRTC. In December the company filed an application for a general rate increase of 11.3% and a notice has been issued for a public hearing on that application to begin on April 6, 1983.

In November, 1982 CRTC published Telecom Decision 82-14 on terminal attachment, which allows BC Tel subscribers with single party service to pay an access charge to BC Tel with the option to purchase or lease their terminal equipment either from the telephone company or from any other supplier. This decision has created an incentive for the provincial telecommunications terminal industry to sell terminals to provincial subscribers.

The Corporate Relations Section has taken an active part in regulatory activities dealing with Telesat's application for rates for its 14/12 GHz service; radio common carrier interconnection hearing before CRTC; BC Tel construction program review held in the fall of 1982; and BC Tel's request for approval of "unbundled" rates for access charges without terminal equipment on single party lines.

It has also been the section's responsibility to respond to complaints, received by the government, about unsatisfactory telephone service or radio or television reception.

Objectives

The Corporate Relations Section maintains a close overview of the operations of the communications industry within the province. In monitoring the activities it has established

liaison with the Ministry of Industry and Small Business Development as well as individual members of the telecommunications industry. These relationships fostered as the ministry played an increasing role in telecommunications activities of this province. It is anticipated that the role to be played in the future will become more important as the industry expands and looks to the government as a catalyst.

Technology Applications Section

Communications Grant Program

The section administers communications grants which provide financial assistance to communities seeking to improve communications services, and to obtain educational television programming. The rugged terrain of British Columbia and the remoteness of many small communities make the provision of many services uneconomical for commercial enterprise.

A general grants program assists with the capital cost of installations to extend conventional communications services to rural and remote communities. Grants are directed towards the establishment of a first service, the introduction of CBC and BCTV television services, and assistance in the construction of community owned facilities. The improvement of terrestrial (rebroadcast) delivery systems has been superceded to a large extent by the introduction of satellite systems.

The Program for Educational and Entertainment Television Services (PEETS) grant program was introduced to assist small communities with the capital cost of satellite earth receive and distribution systems. The program was designed to deliver education and entertainment television channels available on the Anik B satellite. Its principal focus has been the distribution of Knowledge Network educational programming to communities with populations up to 2500. The ongoing evolution of satellite technology has resulted in the Knowledge Network being transferred to the new Anik C satellite, requiring equipment modifications and dish re-aiming by the communities. Ministry staff have assisted in coordinating the changes.

During the year PEETS grants were approved for 12 community associations serving 13 000 households in 49 communities. Grant applications from a further 32 communities were received. The program has now been suspended as part of the government's financial restraint program, but the total number of grants approved during the 15 months that the program has been in

effect is 32, to bring the Knowledge Network to 36 000 households in 135 communities. Staff assistance is provided to communities on an ongoing basis in the development of projects and the preparation of grant applications.

Radio Sites Administration

The ministry acts in an advisory role to the Ministry of Lands, Parks and Housing, and the Ministry of Forests in the administration of Crown land radio sites required by government, commercial, and private users. Approximately 1100 such radio sites are now occupied.

A major study was undertaken this year by the ministry on site management. As the lead agency responsible for planning and management of all communication sites on Crown land, the ministry aims to ensure the most effective and efficient use of communication sites, and to improve service to both government and private users of Crown land sites.

Zone Plate Antennas

A satellite television signal receiving antenna made of plywood has continued to attract considerable public interest. The antenna, invented by the Deputy Minister, applies optical principles to the reception of microwave signals. Because it is significantly less costly, and can be constructed in the home workshop, many requests for its specifications have been received from the general public.

Work to improve and expand the application of this concept has continued. An outgrowth has been the development of a prototype 4 GHz satellite television fresnel lens, constructed of aluminum, by the Physics Department of the University of British Columbia. Materials for this innovative development were provided through ministry funding. The concept shows promise for use with future generations of satellites.

Public Liaison

There is a broad public awareness of the opportunities for improved communications using satellite technology. At the same time, the factors of complexity and cost are less well understood. The ministry has played a leading educational role in responding to numerous enquiries from the public. Public awareness has also been aided by ministerial statements.

Objectives

Public interest in obtaining the educational TV programming of the Knowledge Network continues to be strong. Many communities not yet receiving the channel have expressed an urgent need for access to the Network and its educational benefits.

The advent of satellite technology has proven a major boost to the improvement of telecommunications services for previously underserved parts of the province. The ministry will continue efforts to utilize existing satellite systems more fully and so bring educational programming and conventional communications services to remote communities.

A need exists to deliver conventional radio to remote communities. Investigations underway for the delivery of radio by satellite will be continued, centred largely on the principles and the major base already established.

TELECOMMUNICATIONS SERVICES BRANCH

The Telecommunications Services Branch is comprised of the Operations Section, Switchboard Operations Section, Technical Services Section, and a Special Projects Section.

ROLE AND FUNCTIONS

The principal role of the Telecommunications Services Branch is to provide the telecommunications services required by the government to discharge its responsibilities.

The services include telephone, data communications, facsimile, message delivery, radio systems, and auxiliary systems such as intercoms, paging facilities, sound reinforcement and closed circuit television systems.

PROJECTS AND ACHIEVEMENTS

Operations Section

The responsibility of the Operations Section is to plan, engineer, provide, and manage the leased telecommunications facilities required by government.

Because of the government's fiscal restraints, the scope of some operations had to be curtailed, but adequate telephone service has been maintained. Nearly 3000 service orders were processed during the year.

Major tasks undertaken by the section included:

- planning and ordering new services for the British Columbia Building Corporation which consolidated its Victoria operations under one roof;
- providing similar services for the British Columbia Systems Corporation when it moved into new premises;
- planning for additional services required by the Pre-Trial Centre in Vancouver;
- planning the services for the relocation of the Regional Office of the Forests Service from downtown Vancouver to Burnaby; and,
- planning the consolidation of the telephone service for a number of Ministry of Forests district offices.

A continuing task of the section is participation in the national program for the protection and restoration of telephone service in an emergency. Commonly referred to as Line Load Control, the program is designed to protect and to restore telephone service for designated essential service numbers in the event of line overload or disruptions.

A list of essential designated provincial government service numbers has been compiled. It is updated semiannually and forwarded to the federal Ministry of Communications for inclusion in the national program.

The section was assigned an urgent task this year as a result of a road washout at M Creek on the Squamish Highway, which claimed nine lives. Following an enquiry into the fatalities, the Ministry of Transportation and Highways requested installation of emergency reporting telephone stations along the highway between Horseshoe Bay and Squamish. In February of 1983, a direct line service was established from five strategic reporting sites to the Ministry of Highways Deas Tunnel Control Tower.

The service quickly proved its worth when, on February 11, a motorist used it to report a bridge washout within minutes of its occurrence, thus averting another potential highway disaster.

Planning for the new telecommunications network PROVNET continued throughout the year. A cost-benefit study was completed and Cabinet approved proceeding with the project. It is anticipated that final selection of major equipment for the new network will be made early in fiscal 1983/84.

As an interim measure, to satisfy increasing demands for current intercity service, some existing TELPAK circuits were expanded, and two additional operator positions were established at the parliament building switchboard to cope with an increasing load on that facility.

The Message Centre continued to provide the much needed TELEX, TWX, and Facsimile message service, and CNCP wire and cable service. The centre handled 13 498 messages via TELEX, 41 341 via TWX, 2385 outgoing transmissions via CNCP wire and cable service and 14 182 document transmissions via the Facsimile network.

Switchboard Operations Section

The Switchboard Operations Section is responsible for the operation of switchboards in ministry offices as well as providing circuit switching for the government's telecommunications network TELPAK. The TELPAK switchboards at Vancouver, Victoria, Prince George, Kamloops, and Nelson are operated by branch personnel with overall supervision being provided from Victoria. Local supervisors also provide support and assistance to personnel operating switchboards in other ministries.

Technical Services Section

The Technical Services Section is responsible for providing a variety of telecommunications services not normally connected to the public switched telephone network. These services include mobile radio communications and localized auxiliary systems such as intercoms, sound reinforcement, paging and closed circuit television systems. These systems are government owned, engineered and designed for specific purposes by the Technical Services Section.

Among the variety of projects and activities undertaken during the year, the section:

- in cooperation with major government users of radio communications, produced a comprehensive study entitled "Report on Mobile Radio Communications Within Government;"
- completed the design and acquisition of equipment for the expansion of BC Ambulance radio coverage along Highway 16, to include Smithers, Houston, Burns Lake, Fraser Lake, and Vanderhoof through to Prince George;
- completed design and equipment acquisition for a VHF trunking system for the ambulance service regional dispatch system in the Kamloops region;
- completed upgrading of radio equipment and expansion of systems for the Coordinated Law Enforcement Unit, the Fish and Wildlife Service, the Parks Branch and the Corrections Branch;
- administered some 3000 federal Department of Communications licences for government radio equipment;
- assumed responsibility for ordering radio telephones for government agencies;

- completed development of an inventory system of government owned radio communications equipment;

- completed a study on a proposed paging system for Vancouver General Hospital;

- instituted preliminary engineering and design of a new computer directed sound reinforcement transcription and recording system for the Legislative Chambers;

- completed design and tendering process for an electronic legislative session bells system to replace the existing electro-mechanical chime system;

- provided consulting services to BCBC for localized auxiliary communications systems in new government buildings throughout the province. These included engineering, designing and installation of intercom, sound reinforcement, paging, alarm, and closed circuit television systems in new courthouses in Vanderhoof, Kitimat, Port Coquitlam, Grand Forks and Castlegar, and in existing facilities at Surrey and Cranbrook; and

- designed a paging system for the Ministry of Lands, Parks and Housing in its Gibson Pass Daylodge and a fire alarm system for Barkerville Historical Park.

In addition a planning group was set up to deal with medium and long-range planning for the branch. A major project for the group is planning the implementation of the new government network PROVNET.

One member of the group was appointed to a joint British Columbia Systems Corporation-Telecommunications Services Branch Data Design Team to study present and future applications of data communications in government. A planning paper on text messaging alternatives was presented to the Data Communications Planning Subcommittee and a major study of data network architectures was undertaken.

The planning group produced a comprehensive document outlining the training needs of government telecommunications network users, and presented telephone usage seminars to approximately 100 government employees from different ministries.

A preliminary study was undertaken to evaluate a multi-functional management work station for use in government. (The station incorporates a data terminal and business telephone in one package.)

Special Projects Section

This section was established late in 1982 to supervise a number of the branch's unusual and non-recurring tasks. The initial focus is on the many one-time activities associated with implementing the government's new telecommunications network PROVNET.

UNIVERSITIES DIVISION

The Universities Division administers government policy concerning the operation of the province's three public universities: The University of British Columbia, Simon Fraser University, and the University of Victoria. Grants provided through the Universities Division totalled approximately $353.4 million in 1982/83, or 4.7% of the provincial government's total expenditure. This sum includes $301 million for general operating purposes, $24 million in capital support for buildings and renovations, $14 million for specified grants, $13.8 million for student financial aid, and $629 000 for UCBC operations.

The division has three senior officials; the Assistant Deputy Minister of Universities, the Director of University Programs, and the Project Manager of Capital Support. The Assistant Deputy Minister acts as the senior ministry representative on university matters, and interacts at a policy level with the Universities Council, the universities, and other related agencies regarding university operations and program needs. He also liaises with other provincial and federal ministries and departments to ensure program coordination at the university level. The Director assists the Assistant Deputy Minister in coordinating ministry responsibilities for the development and implementation of educational plans, policies and programs by preparing formal reports and recommendations; managing special projects; and in working with other ministries - especially the Ministry of Education, and its Post-Secondary Department. The Project Manager assists the Assistant Deputy Minister in coordinating ministry responsibilities for the development, implementation and administration of capital plans and projects by preparing five-year plans and annual capital budgets; managing capital expenditures; arranging long-term financing and liaising with appropriate advisory bodies.

THE UNIVERSITIES COUNCIL

The Universities Council is appointed by Cabinet as its advisor on university affairs, through the Minister of Universities, Science and Communications. The council is an independent Crown agency established subsequent to the proclamation of the Universities Act (1974). Its autonomous legal status was received through Order-in-Council in 1978.

There are 11 members, including the chairman, appointed by the Lieutenant-Governor in Council. No council member, however, can serve simultaneously as a member of government and as a university faculty or staff member or student, or a public servant in the provincial ministries of Education, Finance, or Universities, Science and Communications. A member's term of appointment is for three years, and is renewable once, for a similar period. The Chairman is Dr William C. Gibson. The council employs eight professional and support staff on a continuous basis and augments them from time to time with consultants for special projects.

ROLE AND FUNCTIONS

The council serves as an intermediary between British Columbia's three public universities and the provincial government. Its purpose is to promote the orderly development of university education and to create public accountability for university expenditures. Some of the council's most important functions are:

- recommending general funding levels for universities;
- allocating the annual provincial operating grant among the three public British Columbia universities; and
- ensuring that unnecessary duplication of programs is avoided.

Council's mandate has been extended by the ministry to include responsibility for reviewing and approving the university-level program of the British Columbia Open Learning Institute, and academic transfer programs and capital facilities at David Thompson University Centre in Nelson.

Much of the background work for council is performed by four standing committees which include university representation at the vice-president level:

- Business Affairs Committee
- Capital Planning and Development Committee
- Program Coordinating Committee
- Long Range Planning Committee.

The Business Affairs Committee advises council on financial matters, with primary emphasis on the budgets of the public universities, and the Open Learning Institute (university programs). Each August, it receives the funding requests of the universities. From these, council prepares its recommendations to the Minister of Universities, Science and Communications for the provincial operating grant to the universities and the Open Learning Institute for the ensuing fiscal year. Once the total provincial operating grant for that year is known, council allocates the approved funds to the individual universities with the advice of the Business Affairs Committee.

The Capital Planning and Development Committee reviews matters pertaining to the universities' physical facilities, including new capital projects, public works, renovations, and major equipment. Its activities are, in part, concerned with the BC Educational Institution Capital Finance Act, which makes it possible to provide long-term debenture financing of capital projects. The committee reviews the need and suitability of projects proposed by the universities, and then makes a priority recommendation to Council.

The Program Coordinating Committee advises council on all matters pertaining to academic programs. It evaluates all new program proposals presented by the universities according to such criteria as the academic rigor of the curriculum, cost, duplication, and employment opportunities. Both existing and proposed programs are reviewed in order to rationalize the delivery of university-level programs in the province, identifying areas where interinstitutional cooperation would be desirable and specifying special areas of interest at each university. The committee also helps to coordinate the delivery of distance education programs to non-metropolitan areas of British Columbia.

The Long Range Planning Committee is a committee-of-the-whole which includes the presidents of the three universities and the principal of the Open Learning Institute. It promotes discussion about institutional roles, academic objectives, and long-range financial and academic planning. The role of public policy in the future of university education in British Columbia was the 1982 theme of the annual Outlook Conference, a conference which is attended as well by the Boards of Governors of each university and ministry officials. The theme speakers were of national and international stature, such as Dr Clark Kerr, President Emeritus of the University of California.

Many of council's activities are performed on an annual basis as a result of the functions assigned to it under the University Act. The results of these activities are reported in the following section.

PROJECTS AND ACHIEVEMENTS

Operating Grants

Operating grants from the provincial government represent about 87% of the General Purpose Fund income of the universities. Fees represent about 10% more and the remaining 3% is from investment income. The expenditures from the general purpose fund are for the provision of courses of instruction, instructional support and student support. There are four other funds in the universities; sponsored research, trust and endowment, ancilliary enterprises and capital, but they do not receive their funding from general operating grants.

The operating grants are determined by government after considering the recommendations of the Universities Council and the ministry. The general purpose operating grants for 1982/83 as published in the Estimates were almost $313 million, which represented an increase of 12% on the 1981/82 actuals. It is difficult to make comparisons between 1981/82 and 1982/83 as there was a transfer of the medical school expansion funds from Operating Grants - Other and a transfer of funds and responsibilities from Operating Grants - Other to the Ministry of Education for a portion of the administration costs of the Open Learning Institute. As part of the government restraint program, $12 million was removed from the general operating grant during 1982/83. This meant that the grant of $301 million represented an effective increase in operating grants closer to 8% than 12.

Once the size of the general purpose operating grant was established, the Universities Council allocated it among the three universities (see Table 1). For the previous three years, a formula had been used to make this allocation which takes into account the size of the institution, its rate of growth, and the student enrolment mix by year and by type of program. The allocation in 1982/83 was made by using a variation of this formula approach.

TABLE 1

Allocation of General Purpose Operating Grants To Universities, 1981-82 and 1982-83

UNIVERSITY	1981-82	1982-83	PERCENT CHANGE
British Columbia - Medical Expansion	Different Source	$ 8 342 405	N/A
	$161 781 475	172 370 508	6.5
Simon Fraser	61 324 884	66 564 717	8.5
Victoria	48 606 401	53 715 662	10.5
TOTAL	**$271 712 760**	**$300 993 292**	**N/A**

Source: Universities Council of British Columbia

Although council designated some specific uses for these funds, each university received the vast majority of its allocation without restrictions on its autonomy to manage these funds efficiently, taking into account advice from the government and from council.

Operating Grants - Other

Operating Grants - Other are provided to support specific purposes at the provincial universities and programs and services provided by other agencies. As mentioned earlier, comparisons between 1981/82 and 1982/83 are difficult as a result of the transfers. The Annual Report for 1981/82 reported the sums approval prior to transfer. This report provides the actual expenditures for 1981/82 and 1982/83. The 1982/83 fiscal year was one in which the policy of transferring the decision making for funding decisions to the universities was most noticeable and continued the earlier decision with respect to the Medical School Expansion and the funding for the Family Practice and Pharmacy Training. The policy is to fund special major emerging programs offered by the universities for a limited time period from Operating Grants - Other and then transfer the funding and responsibility to the universities and the Universities Council through the general operating grants. The table below shows the impact of these decisions.

TABLE 2

Operating Grants - Other 1981/82 and 1982/83
(Actual Expenditure)

	1981/82	1982/83	
Medical Expansion Projects	$ 2 098 925	$	(1)
Joint Board of Teacher Education	175 000		(2)
Interior Programs	3 807 100	4 114 000	
David Thompson University Centre	649 000	725 000	
Library Recon	810 000	400 000	
Industrial Education Teachers' Training	784 100	439 000	(3)
Open Learning Institute	2 870 700	1 955 000	(4)
Knowledge Network of the West	1 500 000	2 086 000	
Bluma Tischler Fellowship	18 000		(2)
Western Institute for the Deaf	8 000		(2)
BC Forecasting Committee	6 250	7 000	
Health Care Teaching Costs	1 043 946	1 170 000	
Family Practice & Pharmacy Training	168 124		(1)
Engineering Expansion Project	1 500 000	2 000 000	
China Scholar Exchange	50 000		(2)
Chinese Scholar Pgrm. Research and Support		60 000	(5)
Western College Veterinary Medicine	739 974	721 172	
Affiliated Theological Colleges	338 800	379 000	
UCBC Grants - Other Projects		86 000	
Miscellaneous Grants		11 061	
TOTALS	**$16 567 919**	**$14 153 233**	

Notes:

1. The $2 098 925 expended in 1981/82 for Medical Expansion represents the first quarter payment of the grant. The remainder was transferred to operating grants and allocated from that activity during the fiscal year. The grant for Family Practice and Pharmacy Training was transferred to operating grants for the 1982/83 fiscal year.

2. The funding for the Joint Board of Teacher Education was reduced with the very scaled down operation of the board for 1982/83 and was consolidated with the Bluma Tischler Fellowship, Western Institute for the Deaf and China Scholar Exchange Program as UCBC Grants - Other projects for 1982/83.

3. The Industrial Education Teacher Training funding is to be transferred fully to operating grants. It will be completed during 1983/84 but was phased in two steps with one-half the funds transferred during 1982/83.

4. The Open Learning Institute receives grants from the Ministry of Education and this ministry. During 1981/82 this ministry shared the educational support and administrative costs of the institutes with the Ministry of Education. For 1982/83 responsibility and funding for these shared costs were transferred totally to the Ministry of Education which accounts for the reduction in the grant from this ministry. This ministry now funds only the university level programs offered by the institute.

5. There have been two separate programs entitled the Chinese Scholar Program. These were funded by different branches of the ministry. The first program, which is now entitled the China Scholar Exchange Program, is administered by the Universities Council. It assists British Columbia university scholars with travel costs to the People's Republic of China. The scholars are invited by that government to assist in the recovery of the Chinese academic community from the effects of the Cultural Revolution. The scholars give lectures and discuss research with their colleagues in China. The second program, which had been funded by the Science Council, helps defray research equipment and supply costs incurred by the universities on behalf of the Chinese scholars who are upgrading their knowledge at our provincial universities as part of the China-Canada agreement. These costs were transferred to this division for 1982/83.

As well as the grants described above, the ministry provided the following specific grants:

for Engineering Expansion - In response to university initiatives and a study completed by the Universities Council, the ministry provided a special grant of $1.5 million dollars to assist The University of British Columbia to expand its programs in engineering, the University of Victoria to establish a new School of Engineering and Simon Fraser University to develop a program in engineering science;

- to the affiliated theological colleges, Regent College and the Vancouver School of Theology for post-graduate instruction;

- to the Western College of Veterinary Medicine in Saskatoon to train British Columbia veterinary students in the only program in Western Canada;

- for library retrospective conversion of the card catalogues to computer-based microfiche records.

- to the Knowledge Network of the West Communications Authority. The Knowledge Network receives funds from both the Ministry of Education and this ministry. Our funding is to cover the costs of the capital requirements, university programming and the operation of the Network. One of the major components of the last item is the lease cost of the ANIK B satellite which is used to transmit the general interest program and programs offered by our educational institutions throughout the province;

- to the David Thompson University Centre, established in Nelson in 1979. The centre offers both college programs given by Selkirk College and university-level programs offered by the University of Victoria;

- for non-metropolitan programming offered by the universities in all of the major interior and coastal communities and in many of the small communities. Some of these programs are offered through the Knowledge Network; and

- to the Open Learning Institute for the provision of university level programs. As of 1982/83, 44 courses were available - 4 were new, 4 were revised, 19 received minor changes and work continued on 30 new, revised or adapted ones. A new degree program, Bachelor of Arts in Administrative Studies, received approval and is being prepared. The Open Learning Institute offered 171 different sections of the university-level programs in which there were 3576 registrants. These represent increases of 68 and 30% respectively. The institute continues to grow and meet the educational needs of British Columbians and has proven to be a most valuable addition to our post-secondary system.

Enrolment

The increased provincial expenditure on universities recognizes inflationary increases, the growing number of specialized programs, and an increasing number of students. At a time when many jurisdictions in North America were planning for either static or declining enrolments, British Columbia experienced a 5.5% increase in full-time equivalent (FTE) university enrolments over the previous year, ie from 41 561 FTE in 1981/82 to 43 845 FTE in 1982/83 (see Table 3). Similarly, winter session headcounts increased from 48 023 students to 50 458 students in the three universities. Roughly 5% of all individuals in British Columbia aged 18 to 44, living in the region of a university, registered in at least one credit course at a university in the past year. In addition, Table 4 reports the very large number of course registrations in non-credit, continuing education courses of various duration.

TABLE 3

Full-Time Equivalent Enrolments
Entire Fiscal Year

	81/82	82/83
UNDERGRADUATE		
UBC	20 207	20 753
SFU	8 377	9 011
UVIC	7 286	7 904
	35 870	37 668
OLI	464	585
GRADUATE		
UBC	3 644	3 829
SFU	951	1 046
UVIC	632	717
	5 227	5 592
TOTAL		
UBC	23 851	24 582
SFU	9 328	10 057
UVIC	7 918	8 621
	41 097	43 260
OLI	464	585
	41 561	43 845

SOURCE: Universities Council of British Columbia

TABLE 4

University Continuing Education
Non-Credit Course Registrations
1981-82

UNIVERSITY	PERIOD	REGISTRATIONS
British Columbia	Sept - Aug	76 353
Simon Fraser	May - Apr	21 245
Victoria	Sept - Aug	16 390
TOTAL		**13 988**

Grants - Capital Support Programs

The Capital Support Program covers three main areas:

- purchase of capital equipment items,
- maintenance work and improvements to existing facilities (referred to as renovations and public works projects); and
- construction of new buildings and other facilities;

For capital equipment purchases, the ministry provides cash grants to each university. These grants allow each respective university to purchase operating equipment and may range from that required for the maintenance of the capital plant to essential administrative, instructional and research equipment. In 1982/83, cash grants totalled $2 million. The cash grants were allocated according to recommendations from the Universities Council.

Equipment Cash Grant

	1981/82	1982/83
UBC	$1 920 000	$1 250 000
SFU	600 000	405 000
UVIC	480 000	345 000
TOTAL	**$3 000 000**	**$2 000 000**

The Government of British Columbia has made a major capital investment in the universities; the present capital plant of the three universities has an insurable replacement value exceeding $1.6 billion. Each year the ministry provides debentured funding specifically allocated to each university to

maintain and make improvements to the existing inventory of facilities. The availability of funding for new capital initiatives was limited in 1982/83.

While it was unable to provide the same level of funding as the previous year for renovations and public works projects, the government, in recognition of its capital investment, granted approvals totalling $4 000 000. These funds were allocated as follows:

Renovations and Public Works		
UBC	$ 6 400 000	$2 000 000
SFU	3 596 000	1 000 000
UVIC	1 885 000	1 000 000
TOTAL	**11 881 000**	**$4 000 000**

A major portion of the Capital Support Program is devoted to the construction of new facilities. The beginning of the capital process is the five-year plan. Once a year, each university submits its updated five-year plan to the Universities Council. The council then forwards a consolidated five-year plan to the ministry. The five-year plan is a planning strategy, with projects receiving formal approval on a project-by-project basis. After the council submits its recommendations on specific projects to the Minister, most projects pass through a two-stage approval process within the ministry and Treasury Board. At the first stage, a project is approved in principle, complete with a total estimated cost for the project. In addition, funding is authorized for the first 6% of the project's cost. This pre-construction approval funds such activities as preliminary and final architectural plans up to the tender documents. At the second stage, the final 94% of the funding is approved for building construction and site services.

During the 12-month period covered by this report, the following projects, estimated to cost $20 187 000, have passed through at least the first two steps outlined above:

Institution	Project	Estimated Cost
UBC	Clinical Medicine *	$ 4 904 000
UVIC	Science & Engineering Complex	15 283 000

* This shared-funding project involves the participation of various private and public agencies and includes two important projects: the Vancouver General Hospital Eye Care Centre and Shaughnessy Children's Grace Research Institute.

For 1982/83, approvals increasing the borrowing authorization on three approved capital projects totalled $3 357 931. The three projects with the adjusted borrowing authorization are as follows:

Institute	Project	Project Cost	Previous Borrowing Authorization	Revised Borrowing Authorization
UBC	Health Sciences Centre	$33 112 487	$31 317 269	$33 112 487
SFU	Multi-Purpose Extension	6 105 804	4 843 091	6 105 804
UVIC	Science and Engineering Complex	15 283 000	420 000	720 000

During the same 12-month period, building improvements were carried out at a cost of $17 052 061. In addition, two capital projects, costing $11 003 560, were completed. At The University of British Columbia the Home Economics Building, constructed to accommodate the School of Home Economics, was completed at a cost of $5 000 000. At Simon Fraser University the completion of the Ring Road project, at a cost of $6 003 560, will meet current and future traffic volumes and provides underground services to the Discovery Park Development.

All costs incurred for building activities, public works, and renovations are financed through a two-stage debt-servicing procedure. When costs are first incurred, they are covered by

temporary loans obtained by the universities through their banks. Once the temporary bank loans reach a sufficiently high level for a project they are converted into long-term debentures. Through this process, the Educational Institution Capital Finance Authority loans the institution funds to pay the temporary bank loan. In return, the university issues a debenture to the Authority, by which the university undertakes to repay the Financing Authority according to a specified schedule. The ministry provides funds to the university to meet the repayment schedule. There are two interest payments plus one principal payment each year, and the debentures carry a 20-year term.

The advantage of the debenture procedure is that it enables the government to meet the immediate needs of the universities, without creating an immediate drain on the province's cash flow. Since the current capital approval and financing procedures were adopted in 1977, projects with a total worth of $241 748 697 have received approval for borrowing authorization totalling $187 498 893. Against this approved amount, borrowings to date equal $165 100 529. Servicing this debt cost over $21 million in fiscal 1982/83.

Student Aid Programs

Student aid programs are designed to ease the financial burden of those wishing to pursue post-secondary objectives. These programs are administered by the Institutional Support Services, Post-Secondary Department of the Ministry of Education and funded by the Ministry of Universities, Science and Communications.

British Columbia Student Assistance Program

The Student Assistance Program is a comprehensive program of financial aid for post-secondary students. Its purpose is to ensure that residents of British Columbia are not prevented from reaching their educational goals because of financial limitations.

Although the principal responsibility for meeting educational costs must remain with the student and his/her immediate family, this program exists to supplement the student's financial resources when funds otherwise available are insufficient to cover estimated expenses. A standard needs assessment procedure established by the federal and provincial governments determines the level of assistance for each student based on the number of weeks of study.

The BC Student Assistance Program is composed of two interrelated components: the Canada Student Loan Program, and the BC provincial grant. The former is funded by the federal government and provincially administered. The program allowed for a repayable loan of $56.25 per week of studies, with an overall maximum of $9800 for the entire educational period. For example, for a 16-week course a student could have received up to $900 and for a 32-week course up to $1800. The BC provincial grants consisted of a maximum award of $2000 per educational year for single students and $2400 per educational year for married and single parent students.

Funds are normally disbursed in a combination of non-repayable provincial grant and repayable federal loan. Eligibility for the grant may, however, be limited by factors such as program of study, educational institution, and ownership of assets.

While the vast majority of the students in receipt of either the Canada Student Loan and/or BC provincial grants study at one of the three provincial universities, students in certain programs not available in British Columbia can qualify for the grant as well as the loan. These students are reported as Out-of-Province in the following table.

Comparative Award Statistics for the 1981-82 and 1982-83 Program Years[1]

BCASP Grants[2]	1981-82	1982-83*	% Change
In-Province			
Number	12 898	17 316	34.3
Amount	$13 701 024	$21 748 337	59.0
Average Grant	$ 1 062	$ 1 255	18.2
Out-of-Province			
Number	806	769	(4.6)
Amount	$ 1 151 090	$ 1 204 203	4.6
Average Grant	$ 1 428	$ 1 565	9.6
Total Grants Authorized			
Number	13 704	18 085	32.0
Amount	$14 852 114	$22 952 540	54.5
Average Grant	$ 1 084	$ 1 269	17.1
Canada Student Loan[2]			
In-Province			
Number	15 296	21 979	43.7
Amount	$22 470 041	$34 247 240	52.4
Average Loan	$ 1 469	$ 1 558	6.1
Out-of-Province			
Number	2 529	2 704	6.9
Amount	$ 4 259 451	$ 4 697 750	10.3
Average Loan	$ 1 684	$ 1 737	3.1
Total Loans Authorized			
Number	17 825	24 683	38.5
Amount	$26 729 492	$38 944 990	45.7
Average Loan	$ 1 499	$ 1 577	5.2

[1]Figures for 1982/83 as of June 17/83.
[2]Represents the number and amount of grant and loan confirmation which are issued, rather than the awards actually disbursed.
*Figures to June 17/83.

Special Assistance Program

The Special Assistance Program is designed to provide financial assistance to students attending post-secondary studies on a part-time or short-term basis and who do not, therefore, qualify under the regular BC Student Assistance Program.

British Columbia residents demonstrating financial need while enrolled in less than 60% of full course load or in programs less than 12 weeks duration may qualify for Special Assistance Program funds, providing their course of study leads to a certificate, diploma, or first degree.

Normally, program assistance is aimed at mature or single parent students attempting to upgrade marketable skills; however, students receiving aid from other government sources, such as the Ministry of Human Resources, are also considered providing that the government agency has already refused to fund educational costs.

A maximum of $300 in non-repayable grant funds is available per normal application period to qualified students on the basis of need.

Work Study Program

The Work Study Program, initiated in 1977, is designed to provide on-campus work experience for students requiring financial assistance while attending a post-secondary institution.

A limited number of part-time on-campus jobs, averaging 5 to 15 hours per week, may be made available to post-secondary students.

The program is open to British Columbia residents studying at participating universities, colleges, and institutes located in British Columbia.

Students demonstrating a financial need, greater than the maximum allowable limit under the terms of the Student Assistance Program, may apply for the Work-Study Program.

The Work-Study Program was established to:

- aid students in reducing indebtedness incurred while pursuing a post-secondary program of study;

- assist students in meeting additional educational costs that are not usually covered by the BC Student Assistance Program;

- assist in the absence of student financial resources; and

- where possible, provide students with career-related job experience.

Since the number of positions is limited, institutions are under no obligation to guarantee placement. Jobs made available through the Work-Study Program will be administered by the institutions, according to their internal policies and procedures.

SCIENCE AND TECHNOLOGY DIVISION

ROLE AND FUNCTIONS

A Science and Technology Support System has been established in British Columbia through the active participation of members of the academic community and industrial sector. This system is designed to provide an environment -- both physical and intellectual -- in which scientific research and technological development can flourish and where high technology industrial growth and development can take place.

The major work of the Science and Technology Division is accomplished through the functions of the following organizations:

- The Science Council of British Columbia;
- The Secretariat on Science, Research and Development;
- The Discovery Foundation, and its wholly-owned subsidiary Discovery Parks Incorporated; and,
- The British Columbia Research Council and its technical operating component, BC Research.

Funding provided through the Ministry of Universities, Science and Communications primarily supports the activities of the Science Council of British Columbia, the Secretariat on Science, Research and Development and Discovery Foundation and Discovery Parks Incorporated. The ministry also provides funding to support core research carried on by BC Research.

In addition to these organizations, the Internal Research Advisory Committee (IRAC) has been established to review and maintain an awareness of the type of ongoing research and development required by government. IRAC is an intragovernmental committee, chaired by the Deputy Minister, Ministry of Universities, Science and Communications.

The Science and Technology Division develops, coordinates, directs and assesses programs, and makes recommendations concerning research program proposals and program alternatives. In addition, assistance is provided to persons and organizations seeking information and direction concerning specific research and development activities and opportunities within the province.

PROJECTS AND ACHIEVEMENTS

Research Projects

Through the Science and Technology Division, the ministry initiates and promotes special projects involving scientific research and technological development.

Compressed Natural Gas (CNG) as a Transportation Fuel

In 1982/83 the ministry continued to support and promote the use of natural gas as a vehicle fuel. Much of this effort was effected through membership in the Energy Development Agency which was responsible in 1982/83 for maintaining funding support for programs begun or announced in earlier years. These programs have included the CNG Training Program located at the Pacific Vocational Institute in Burnaby, the Methane Energy Development Program centered in Vancouver and the Provincial Incentive Grant Program which covers $200 of the cost of converting a private vehicle to the use of CNG as a motive fuel.

The Methane Energy Development Program has been primarily responsible for the government's effort in promoting conversion of fleet vehicles to natural gas. During the past year, more than 500 fleet vehicles have been converted. Conversions are now taking place at a rate of up to 100 per month and include such fleet vehicle operations as Westcoast Transmission, Metro Transit, Black Top Cabs, BC Hydro, the RCMP and most recently, the BCAA. Other industrial and business fleet vehicles have been converted for testing and demonstration purposes and many more conversions are expected next year.

Private natural gas fuelling station outlets have been established in several locations. Public fuelling stations are now operating in Vancouver, Richmond and Kamloops, with several more stations expected to be in operation throughout the province in 1984.

On a more technical level, the demonstration and research activities undertaken at BC Research and the alternate fuel laboratory in the Department of Chemical Engineering at UBC, have continued, and are now funded primarily through the federal Department of Energy, Mines and Resources. BC Research and the alternate fuels laboratory have been recognized as primary centres for this type of research, development and demonstration activity in Canada.

Biological and Biomedical Research

Through initiatives taken by the ministry in conjunction with Pacific Isotopes and Pharmaceuticals Limited, the Terry Fox Medical Research Foundation, and the Wellcome Foundation of England, agreement was reached in 1981 to produce and test a highly purified form of interferon, a drug currently being investigated for its possible use in treating some forms of cancer and other viral illnesses. This agreement has led to a considerable amount of clinical research now underway in British Columbia and in other parts of Canada and the United States. Further efforts are underway to build upon this with other research activities in the biomedical and pharmaceutical field. It is the ministry's intention that British Columbia become a centre for highly sophisticated biological and biomedical research and development, leading in due course, to new industrial development.

High Technology Program

Since the official opening in June 1981 of Cominco's new gallium arsenide production plant, the ministry has promoted development of a gallium arsenide based semiconductor industry in British Columbia. (Gallium arsenide is a high quality semiconductor material which is being increasingly used as a basis for establishing high mobility integrated circuits, optoelectronic devices and microwave devices.) British Columbia's capability of producing high quality gallium arsenide semiconductor material could provide the stimulus for a gallium arsenide based microelectronic chip foundry and device manufacturing capability. Pacific Gallium Arsenide Ltd has been established as a focus for this activity.

As a further link in the establishment of high technology microelectronics industry in British Columbia, the ministry was involved in encouraging a high technology corporation to establish its chip assembly plant operation on southern Vancouver Island. It is intended that this facility, which will be the largest contract chip assembly house in North America, will package silicon chips for the export market.

Promotion of Scientific Activities

Discovery Fair was again held in Vancouver October 20 to 28. This fair, sponsored by the ministry, is a display of high technology research and development within the province. Ninety-nine exhibits, presented by 34 separate exhibitors, comprised this year's Discovery Fair. Over 16 500 visitors attended the eight day event.

The BC Discovery Magazine was published in the fall of 1982 which provided further information to the public and the scientific community on research development and activities in the province. Feature articles focused on biotechnology in British Columbia, new developments in ground receiving systems for processing information from satellites, and other high technology and industrial research activities in the province.

SCIENCE COUNCIL OF BRITISH COLUMBIA

The Science Council of British Columbia, and the Secretariat on Science, Research and Development were established in June 1978 under the Science Council of British Columbia Act. The council and secretariat report to the Minister of Universities, Science and Communications. Details of council activities may be found in the Science Council's annual report.

The following are members of the Science Council of BC (as at March 31, 1983):

Chairman: R.W. Keyes, Consulting Economist
J.F. Cochran, Dean of Science, Simon Fraser University;
D.H. Copp, Department of Physiology, University of British Columbia;
H.M. Ellis, Director of Research and Development, BC Hydro and Power Authority;
J.C. Madden, President, Microtel Pacific Research Ltd;
R.D. Malcolm, Barrister and Solicitor, Ladner Downs;
V.A. Mode, Executive Director, BC Research;
J.D. Murdock, President, Chemetics International Ltd;
R.A. Nodwell, Head, Department of Physics, University of British Columbia;
T.W. Pearson, Department of Biochemistry & Microbiology, University of Victoria;
S.C. Rooney, President, Durand Machinery Company Ltd;
P.C. Trussell, Chairman, Forest Research Council;
L.M. Wedepohl, Dean of Applied Science, University of British Columbia;
H.M. Wright, Chairman, Wright Engineers Ltd;
G.S. Balcom, Vice President, Sydney Development Corporation;
W.G. Armstrong, retired, Honourary member and special advisor.

The following attend meetings, but are not members:

M.A. Cairns, Associate Director, Secretariat on Science, Research and Development;
J.T. Sample, Executive Director, Secretariat on Science, Research and Development;
R.W. Stewart, Chairman of IRAC, Deputy Minister of Universities, Science and Communications.

The council's members are researchers, research managers, business executives, and senior administrators from both the academic and business sectors, who provide their services on a voluntary basis.

ROLE AND FUNCTIONS

The principal duties of the council, as described in the Science Council of BC Act, are to:

- consider all matters brought to its attention by the Minister and, where required by the Minister, report its findings to him;
- formulate recommendations respecting the acquisition, development, and dissemination of scientific, technological, and scholarly knowledge to promote the industrial, economic, and social development of the province;
- advise the government on implementation of science policy;
- gather and organize information on scientific research;
- facilitate discussions on science policy with the Government of Canada or a province or with an interested person;
- recommend the establishment and awarding of fellowships, scholarships, exhibitions, bursaries, grants, and prizes to encourage development of improved technology and retention of skilled research personnel in the province; and
- evaluate research and development proposals submitted to the council by the secretariat, and make recommendations to the government respecting the funding of these proposals.

Research and Development Policy

The objectives of the council's research and development policy for British Columbia are to:

- consolidate and expand employment and productivity of existing industries by establishing, maintaining, and improving their competitive position -- especially in export markets -- with particular attention to the maintenance of long-term productivity of the province's forests, mines, agricultural lands, and waters, and to the further development of fossil fuel resources;

- stimulate new industrial opportunities in the province through the establishment of technology-based manufacturing and service industries;

- improve the quality of life in the province by providing, through health-care research, the finest medical services at the most reasonable cost by reducing industrial and urban pollution and by protecting the natural environment from lasting damage; and

- facilitate in all recognized disciplines, the accumulation of scientific and technological excellence in the region and, in so doing, provide opportunities for young people who are receiving advanced training in our educational system, to become involved in the social and economic development of the province.

PROJECTS AND ACHIEVEMENTS

Awards

The Graduate Research Engineering and Technology (GREAT) Awards are desiged to encourage graduate students to work on research projects for local companies. The awards provide a scholarship of $11 500 per year for a maximum of three years to graduate students at British Columbia universities who are working on projects in cooperation with local industries and organizations. During the past year, 38 scholarships were renewed and 54 new awards were made, together worth a total of $1 058 000.

The Industrial Post-Doctoral Fellowship (IPDF) is designed to stimulate the employment of recent doctoral graduates in private industry. The award provides a subsidy of $25 000 per year (1982/83) for a maximum of two years to the salary of a recently qualified PhD employed with a British Columbia company. This is

to provide an incentive for companies to develop their research capabilities, and allow an easy transition from an academic background to an industrial one for the award holder. During the past year two fellowships were renewed and one new award was made.

The BC Science and Engineering Awards are annual awards recognizing the contributions of local scientists and engineers to the economic and social development of British Columbia, including contributions to the understanding and appreciation of science by the public. Awards are made to both senior researchers who have made extensive career contributions, and younger investigators who have made an outstanding contribution. A gold medal and citation are presented to each award recipient. A maximum of three awards may be made in any year from among the following categories: natural sciences, health sciences; engineering and applied sciences; industrial innovation.

The 1982 BC Science and Engineering Gold Medals went to Dr Anthony S. Arrott, Department of Physics, Simon Fraser University; Dr Julia Levy, Department of Microbiology, The University of British Columbia; and to Techwest Enterprises Ltd, whose design and engineering team designed a heave compensation system which helps stabilize cranes used on vessels.

Secretariat on Science, Research and Development

The primary responsibility of the secretariat is to provide administrative services to the Science Council, such as the preparation of material for meetings, implementation of council programs, response to public enquiries, and the financial administration of council affairs. In particular, the secretariat has established and coordinates the procedures for the evaluation and funding of research projects, GREAT graduate scholarships, and industrial post-doctoral fellowships.

The secretariat provides a similar service to the BC Health Care Research Foundation, which makes awards available for the support of medical and health care research related to provincial concerns.

The secretariat also attends meetings of the Internal Research Advisory Committee.

Liaison is maintained with the federal government and its agencies, such as the Ministry of State for Science and Technology, Statistics Canada, the Department of Supply and Services, the National Research Council, and other provincial governments and research organizations.

Other Activities

The Science Council in cooperation with the Discovery Foundation established British Columbia's first Innovation Office to help people bring their projects to the point where they can enter the marketplace. Mr Keith McPherson was appointed Coordinator of the Innovation Office in October, 1982. Through a variety of activities, including clinics devoted to prototypes, business planning and marketing, seminars and workshops on technology, the requirements of potential customers, and patents, the Innovation Office can assist to stimulate the entire process of taking an idea and seeing it through to commercial success.

The Science Council also initiated other related activities to promote and encourage scientific research and development in the province. In its advisory role to government, council prepared and submitted in November, 1982 a paper entitled "A Research and Development Policy for British Columbia in the Eighties." This paper has been a direct influence on government policy, particularly with respect to recently announced programs to promote new innovative high technology enterprise in the province.

Science Grants Program

Through the ministry's support, a research fund has been established by the Science Council to award grants for research projects consistent with the council's stated objectives. The following categories have been recognized, each having a subcommittee appointed by the council:

- aquatic sciences,
- electronics and communications,
- energy,
- food and agriculture,
- forests and forest projects,
- manufacturing,
- mining, minerals and metals; and,
- transportation.

Subcommittees of the Science Council, composed of individuals involved in academic and industrial research assist the Science Council by reviewing applications and making recommendations for the support of the most promising projects. Competitions for research grants take place twice a year. Of the two competitions for research grants held during 1982/83, a total of $4 711 926 was awarded through Research Competition Number Six (RC #6) and Number Seven (RC #7). Awards from these two competitions went to 91 projects of which 40 were renewals and 51 new awards.

Examples of awards given in 1982/83 in each of the categories indicated above are published in the 5th Annual Report of the Science Council of British Columbia.

BRITISH COLUMBIA RESEARCH COUNCIL

The BC Research Council is an independent, non-profit society incorporated in 1944 under the Societies Act of British Columbia. Dr V. Alan Mode is the Executive Director of BC Research, the technical operating component of the council.

ROLE AND FUNCTIONS

The council was established to provide facilities for the encouragement and promotion of technological research and services, with particular application to the industrial development of the Province of British Columbia. The council consists of approximately 65 members, mainly resident in British Columbia, who are concerned with the advancement of science and technology in the province.

Since its inception, the council has operated a scientific, engineering and technical laboratory facility called BC Research. The laboratory conducts research, development, and other technical work under contract to sponsors both in industry and government, as well as its own research on new technical developments. While BC Research undertakes research of provincial interest and importance, the majority of its activities are not directly funded by the provincial government. Over 70% of BC Research revenue is derived from industrial and government contracts, and an additional 11% of revenue is devoted to core research studies on behalf of the provincial government.

BC Research is directed by a board of management and an executive director. There are 22 members on the board from industry, the provincial and federal governments, universities, labour, and the staff of BC Research.

Techwest Enterprises Ltd, a development company incorporated in 1970 under the British Columbia Companies Act, is a wholly-owned subsidiary of the BC Research Council. It has its own board of directors and operates independently of the council. The role of Techwest is to make the technological products developed by BC Research and other research groups available to the marketplace.

PROJECTS AND ACHIEVEMENTS

In June 1979, the consulting firm of Philip A. Lapp Limited issued a report, with recommendations for the future, on the operation of BC Research and Techwest Enterprises Ltd. One recommendation was that the provincial government should make greater use of BC Research staff and facilities for the industrial development of the province. Accordingly, the ministry provided initial funding for the establishment of research into fisheries technology at BC Research and, later in 1979, initiated plans for research in coal liquefaction. The Lapp Report called for the establishment of a large, industrially-oriented program of research and development, with the provincial government providing core funding. During the fiscal year 1982/83, BC Research continued work on the program funded by the ministry in fisheries technology, and began exploratory work in biotechnology as a new area with significant potential for the province. The coal liquefaction program funding was transferred to the Energy Development Agency during the year and is no longer part of the core funded programs.

Fisheries Technology Program

This program was established to provide technical information and to do research for the processing sector of the British Columbia fishing industry. Study topics for the program are developed with the guidance of a Technical Advisory Committee, with representatives from industry, government, and universities.

British Columbia seafood products are sold world-wide. The technical information service is particularly concerned with smaller processing companies who may find it difficult to keep up with new methods and technologies. Contacts with the industry are made by phone, visits to the laboratory for discussions, or through regular visits to plants by scientific staff, who then work directly with industry to solve practical operating problems. Technical enquiries have arisen from both large and small companies regarding a range of topics, including processing of specialty products, quality problems, weight control, grading and handling, and shellfish processing.

The research program is focused on topics relating to salmon caviar, herring, groundfish, and shellfish.

The fisheries technology group continued the study of salmon caviar and began the transfer of this technology to the local industry. Five industrial lots of caviar, totalling over 450 kg were produced. The first industry seminar on caviar production

was attended by 28 representatives from 20 companies. BC Research also participated in a design and development project to produce a new caviar jar for use by the industry. BC-produced caviar is now available in local outlets using these distinctive glass containers.

Work on improving the quality of herring roe continued, with the examination of quality changes during cold and frozen storage.

Of special importance to the British Columbia canning industry is product safety. In cooperation with local industry and international can producers, BC Research is preparing the first industry-wide salmon canning process manual. This manual is to be issued in May 1983, in time for the 1983 salmon canning season.

Information from the Fisheries Technology Program is available to all members of the industry through a newsletter, industry information reports, and technical reports.

Biotechnology Program

The Board of Management of BC Research identified the Biotechnology Program as a core area in 1982.

In British Columbia, large quantities of fibrous sludges from pulp mills and apple pomace from fruit juice operations are available at very low cost. While no satisfactory utilization of the sludge has yet been found, apple pomace is utilized as cattle fodder.

A study was initiated to determine the technical feasibility of growing oyster mushrooms on pulp mill sludges and pomace, since oyster mushrooms are reportedly capable of growing well on cellulosic/carbohydrate wastes and are becoming an increasingly important agricultural crop in Europe, Asia and India.

Pleurotus sajor-caju, an Indian oyster mushroom variety, was selected for this study. This organism is recognized for its high yields, mild taste and good texture as well as for its low demands on cultivation conditions.

The results of the study were encouraging. The *Pleurotus sajor-caju* grew satisfactorily on mixtures of pulp mill sludges, fortified with 2-3% soya flour. Improved growth was observed on mixtures of kraft pulp sludges, pomace and soya.

Limited consumer acceptability tests indicated that *Pleurotus sajor-caju* would find a willing and growing market if it was

produced locally on a sustained basis. Based on these findings, the British Columbia Ministry of Agriculture volunteered to build and operate, a demonstration facility for cultivation of oyster mushrooms and to test the British Columbia market on a larger scale.

Future *Pleurotus* work at BC Research will focus on technical problems and optimization of parameters as they are identified by the experience attained at the demonstration facility.

DISCOVERY FOUNDATION

Discovery Foundation, funded by the Ministry of Universities, Science and Communications, is a registered non-profit society in the province, established to pursue the advancement of scientific, technological, and industrial research skills in British Columbia.

The following are members of the Discovery Foundation Board of Trustees:

H.E. Petch (Governing Trustee) President & Vice-Chancellor, University of Victoria;
D.M. Brousson (Executive Trustee) Dean of Continuing Education and Industry Services, BC Institute of Technology;
J.V. Clyne, Board of Governors, University of British Columbia;
H. Eppich, President, EBCO Industries;
G.H.D. Hobbs, Corporate Director and Private Investor;
D.T. Kenny, President, University of British Columbia;
N.B. Keevil, Jr, President, Teck Corporation Ltd;
P.L. McGeer, Minister of Universities, Science and Communications;
J.C. Madden, President, Microtel Pacific Research Ltd;
J.S. MacDonald, Chairman, MacDonald Dettwiler & Associates;
K.G. Pedersen, President, Simon Fraser University;
T.G. Rust, President, Crown Zellerbach Canada Ltd;
T.J. Ryan, President, Willow Creek Equities Ltd & Corporate Director;
G.C. van Roggen, Senator;
D.J. Saxby, President, Discovery Parks Incorporated;
G.C. Gibson, Director, Gibson & Clark Properties;
A.V. Marcolin, President, Electronic Materials Division, Cominco;
R. Parkinson, MD (UBC), FRCP (C) Psychiatry;
D. Hamilton, Corporate Director.

ROLE AND FUNCTIONS

Discovery Foundation works towards broadening and strengthening the economic base of the province by enhancing the establishment and growth of scientific and technological industries, skills and expertise, with local and world markets. Acting as a charitable institution, without profit to its members, Discovery Foundation operates for the benefit of the people of British Columbia and the post-secondary institutions participating in the Discovery Parks.

PROJECTS AND ACHIEVEMENTS

Discovery Foundation has a wholly-owned subsidiary, Discovery Parks Incorporated, which was designed to create research parks adjacent to the principal education centres in the province -- The University of British Columbia, Simon Fraser University, the University of Victoria, and the British Columbia Institute of Technology. The Discovery Parks are designed to:

- stimulate development of high technology industries within the province,
- encourage the growth of research and development,
- promote an interaction between tenants of research parks and the students and faculty in adjacent learning institutions,
- provide employment opportunities for graduate students; and,
- provide a bridge between scientific innovation and industrial application of high technology.

The following criteria form the basis for approval of organizations wishing to take advantage of locations in the Parks:

- operations in the Parks must be primarily concerned with research and technology,
- research or technology related to products designed for the destruction of human life will not be permitted,
- product manufacturing or assembling shall be limited to development,
- pilot plants will be permitted in which processes planned for use and production elsewhere can be tested; and,
- only nuisance-free, clean operations will be permitted.

The Multi-Tenant Research Facility located in the Discovery Park adjacent to the BC Institute of Technology, Burnaby, BC, was completed in June, 1982 with the first tenants completing their leasehold improvements and taking occupancy by January, 1983. To date, 15 companies have moved into the facility

performing research in a wide variety of fields. Discovery Foundation and Discovery Parks Incorporated have moved into the building, providing assistance and support services to the many "incubator" tenants. The world economic recession has, however, adversely affected previously established goals, ie, the construction of the 10220 m^2 MacMillan Bloedel research facility on the optioned 7 ha site has been deferred until forestry profits improve. The leasing projections for the Multi-Tenant Facility have been amended to achieve full occupancy by year-end, 1983.

The first major tenant at Simon Fraser University, Microtel Pacific Research Limited, is in occupancy. Roads, sidewalks, lighting, utilities, and landscaping for the first phase of development at the Simon Fraser University site have been completed.

Agreement was reached between The University of British Columbia and Discovery Parks Incorporated for the construction of a Discovery Park at The University of British Columbia. Design work for the first phase of development has been completed.

Discussions have been held with the Pulp and Paper Research Institute of Canada (PAPRICAN), regarding the leasing of a 2 ha site at The University of British Columbia Discovery Park, on which to locate an 7432 m^2 research facility. The final site decision is yet to be made.

Approval in principal has been received for funding under the Industrial Development Subsidiary Association (IDSA) for construction of an Aquaculture Research Centre to be constructed at the Pacific Biological Station in Nanaimo, British Columbia. Preliminary site studies are underway.

A "Discovery Club" was incorporated under the Society's Act in February, 1983. It was formed to promote and encourage scientific and business growth and development by providing a forum for the exchange of ideas between investors, businessmen, scientists, inventors, researchers and entrepreneurs. The "Club" sponsors seminars, workshops and meetings at locations throughout British Columbia, in order to foster the exchange of ideas and to provide its members with the opportunity to meet people in similar or related fields of expertise. A "BC R&D" bi-monthly newsletter is published (present printing is 5000 copies, expected to increase to 10 000) keeping the members informed on new developments and discoveries in the high technology field. Membership in the "Discovery Club" totals 400 and it is administered by Discovery Foundation.

In coordination with the Science Council of BC and the Research Secretariat, the BC Innovation Office was established in the fall of 1982. The primary function of this office is to support and assist in the commercialization of innovation.

Future projects presently under development include:

- the Fish Technology Centre, University of British Columbia;
- preliminary discussions have been held regarding the establishment of Regional Research and Development/High Technology Business Centres at:

  - Okanagan College, Kelowna;
  - Caribou College, Kamloops; and
  - Malaspina College, Nanaimo.

Discovery Foundation encourages the development of high technology industry and other economic activity, where a large proportion of the value added comes from the use of scientific and technical knowledge and skills. This provides opportunities within the province for skilled young people who now will not have to choose between seeking employment outside the province, or working at occupations less suited to their talents in order to remain in British Columbia.

METRIC CONVERSION AND STANDARDS INFORMATION OFFICE

Canada's Metric Conversion Program began in 1970 when the Canadian Parliament unanimously endorsed the White Paper that proposed the adoption of the metric International System of Units (SI) for Canada. In 1973, the BC Government established an Interministerial Metric Conversion Committee and, in 1976, a Metric Information Centre was formed to provide metric conversion information.

METRIC CONVERSION

ROLE AND FUNCTIONS

Metric conversion information is provided to governments, industry and associations to assist the orderly conversion to SI at minimum cost and with the least inconvenience. Metric conversion information is supplied and updated through constant liaison with Metric Commission Canada. An ongoing check is also maintained on all sectors of the economy affected by conversion. The information obtained is provided to the public or industry, as requested.

PROJECTS AND ACHIEVEMENTS

Contrary to earlier indications, the retail food conversion program did not result in an increased number of enquiries. The program is progressing well with no apparent serious problems.

Metric information activities are diminishing and changing from general enquiries to requests for more technical information.

The Metric Information Office, with the cooperation of C-FAX Radio of Victoria and the Charles Crane Library at The University of British Columbia, completed production and distribution of 1000 sound tapes of metric information for the visually impaired.

Crane Library is arranging to make the tapes available to the Ministry of Education for visually impaired students in the schools system.

STANDARDS INFORMATION

ROLE AND FUNCTION

Information on standards is provided to business and industry for technological support and to keep abreast of changes in technology.

To provide information on standards, a standards library is maintained with an up-to-date collection of Canadian and selected international industrial standards, including the only complete set of International Organization for Standardization (ISO) standards in British Columbia.

PROJECTS AND ACHIEVEMENTS

As a response to the slow pace of conversion in the construction industry, a monitoring subcommittee of the BC Metric Conversion Committee has been formed. The committee consists of representatives of all branches of the government concerned with construction. The principal aim of the committee is to identify and resolve specific conversion related problems and institute the most cost effective policies regarding competitive bidding, material substitutions and design flexibility for government construction projects.

The federal government has addressed the conversion problem in the construction industry by creating a Public Awareness Committee for the construction sector. This committee has a twofold goal: (1) to ensure the Canadian public is aware of the advantages of the change to SI in construction; and (2) to promote the use of SI products, in order to reduce or eliminate the need for dual inventories.

In keeping with government policy on fiscal restraint, and because of a slowdown in overall industrial activity in the province, a planned addition to the standards collection has been postponed. Despite the slowdown, however, there has been a general increase in demand for technical and standards information.

THE FUTURE

Future activities will involve reviewing and summarizing the work of sectors scheduled to stand down, to ensure that the necessary legislation and information needs of all sectors have been satisfied. This will probably require restructuring of steering committees with increased intersectorial activities.

Because of the slow pace of conversion to SI in the construction and health sectors, this branch will probably have to provide assistance to industry through seminars or special information programs.

Some sectors, because of their interdependency with progress in the United States, will take longer to convert than first anticipated. These include air and rail transport; aircraft and parts manufacturers; business machines; rubber products; industrial fasteners and livestock marketing.

By the spring of 1985, it is expected that 75% of the non-technical program tasks that are not interdependent with the United States will have been completed. However, sectors that have stood down may, at times, be reactivated to resolve contentious issues that could impact on other sectors and retard their planned completion dates.

The standards information service will respond to the demands of changing technologies and industry needs.

PERSONNEL CONTINUED

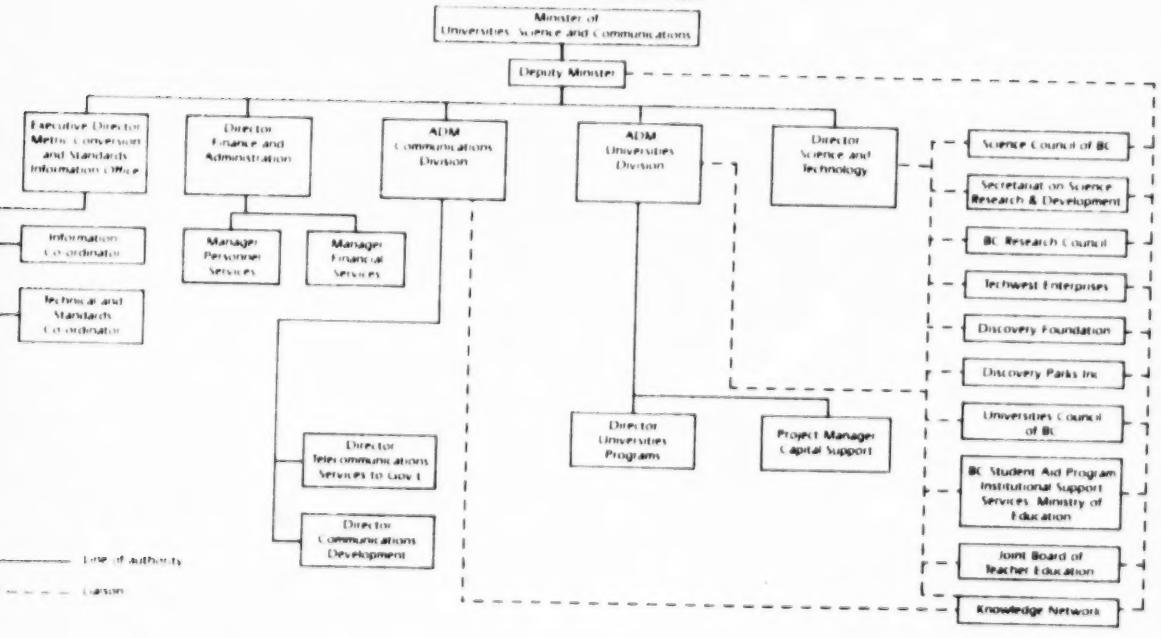
AUXILIARY EMPLOYEES
G. Barsalou, Design Technician

COMMUNICATIONS DEVELOPMENT
T.A. Prentice, Director
I.M.L. Edwards, Secretary
L. Gray, Clerk
E.M. Byrnes, Manager, Technology Applications
P.J. A. Hunter, Engineer
D.R.A. Miller, Communications Engineer
J.A. Whybrow, Economic Advisor
L.R. Allen, Policy Advisor
P.N. Templeman, Manager of Policy
P.L. Gardner, Manager Corporate Relations
D. Slaco, Policy Advisor

AUXILIARY EMPLOYEE
L. Weberg, Clerk

MINISTRY OF UNIVERSITIES, SCIENCE AND COMMUNICATIONS

ORGANIZATIONAL CHART



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